

REMARKS/ARGUMENTS

The Examiner is asked to enter this request for reconsideration and reconsider the final rejection of previously presented Claims 4 and 6-11 under 35 U.S.C. § 103 over Utecht (U.S. Patent 6,184,310, issued February 6, 2001) in view of Carr (US 2004/0250972 A1, published December 16, 2004), Takahata, Snow, and Koichi, as evidenced by Lai (EP 0331047, published September 6, 1989) and Varveri (U.S. Patent 3,639,208, February 1, 1972). Office Action dated October 27, 2010 (OA), page 4, first paragraph).

Applicant greatly appreciates the Examiner's withdrawal of all prior rejections under 35 U.S.C. § 102/103 over Kuo (U.S. Patent 6,273,998 B1, issued August 14, 2001) alone, or in view of Varveri, Takahata, Snow and Koichi (OA, p. 2, 1<sup>st</sup> ¶). The rejections over Utecht, Carr, Takahata, Snow, Koichi, Lai, and Varveri were maintained and made final.

No claim has been amended.

Reconsideration of the final rejection is respectfully requested in view of the following remarks.

Rejection under 35 U.S.C. § 103 over Utecht, Carr, Takahata, Snow, Koichi, Lai and Varveri

Previously presented Claims 4 and 6-11 stand finally rejected under 35 U.S.C. § 103 over Utecht in view of Carr, Takahata, Snow, Koichi, Lai, and Varveri. The rejections should be withdrawn.

The applied prior art should always be considered for everything it fairly suggests. *In re Burckel*, 592 F.2d 1175, 1179 (CCPA. 1979). All evidence which supports patentability should be considered with all evidence which negates patentability. *In re Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988). To hold claimed subject matter unpatentable under 35 U.S.C. § 103, the PTO must weigh all the evidence favoring the rejection against all the countervailing evidence. *In re Piasecki*, 745 F.2d 1468, 1471-72 (Fed. Cir. 1984); *In re Skoll*, 523 F.2d 1392, 1397 (CCPA 1975). Contrary to law, the Examiner here has not

considered the prior art for everything it teaches by way of technology. *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907 (Fed. Cir. 1985). Contrary to law, the Examiner here has not considered and weighed all the evidence favoring patentability and all the countervailing evidence. *In re Piasecki*, 745 F.2d at 1471-72. Contrary to law, the Examiner here has not considered what the combined teachings of the prior art references reasonably would have taught a person having ordinary skill in the art. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

The PTO has the burden of proof to establish the factual basis for its rejections under 35 U.S.C. § 103. *In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir. 1984); *In re Warner*, 379 F.2d 1011, 1016 (CCPA 1967). To support a conclusion of obviousness, the prior art must enable the person having ordinary skill in the art at the time Applicant's invention was made to reasonably expect that the claimed subject matter could be successfully made and used without undue experimentation. *In re O'Farrell*, 853 F.2d 894, 903 (Fed. Cir. 1988); *In re Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988); *Merck & Co., v. Biochraft Laboratories, Inc.*, 874 F. 2d 804, 809 (Fed. Cir.1989).

As previously stated, Utecht teaches that "carbamate-functionalized polymers [also having amino-containing units] are useful as retention, drainage and flocculation aids and also useful as fixatives in papermaking (Utecht, col. 6, ll. 56-58). Utecht states (Utecht, col. 6, ll. 58-59; emphasis added), "They are used in the customary amounts for this purpose."

Lai teaches that hydrolyzed polymers prepared from N-vinylformamide monomers are conventionally used as retention aids for fillers such as titanium dioxide in papermaking methods in amounts ranging from "0.05 to 0.5 wt%, preferably 0.1 to 0.2 wt%, . . . based on fiber" (Lai, p. 5, ll. 50-56; p. 9, Claims 1-15). Lai shows that the polymers are not effective as retention aids for fillers such as titanium dioxide in lesser amounts (Lai, p. 8, Example 12, ll. 49-50). Contrary to the Examiner's argument that Lai is merely ancient history, persons

having ordinary skill in the art reasonably would not have expected Lai's experimental objective evidence to change over time.

The Examiner states (OA, p.2, ¶ 3):

Lai . . . was only used for evidence that acid hydrolyzed polymers prepared from N-vinylformamide monomers are cationic. In addition, Utecht . . . postdates Lai . . . by a decade and has realized that lower amounts of such polymers can be used effectively for retention and drainage.

However, prior art must be considered for everything it would have taught by way of technology. *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d at 907. It is improper for the Examiner to dismiss any part of a reference's pertinent disclosure, especially where as here, the issue is what amounts of polymeric retention aids having amine-containing units are customary amounts for use as retention aids for fillers such as titanium dioxide in papermaking methods, and Lai's teaching is supported by substantial experimental evidence.

Lai teaches that hydrolyzed polymers prepared from N-vinylformamide monomers are conventionally used as retention aids for fillers such as titanium dioxide in papermaking methods in amounts ranging from "0.05 to 0.5 wt%, preferably 0.1 to 0.2 wt%, . . . based on fiber" (Lai, p. 5, ll. 50-56; p. 9, Claims 1-15; and p. 8, Example 12, ll. 49-50). That well-supported teaching cannot be summarily disregarded.

Having summarily dismissed material portions of the evidence of record, the Examiner finds, contrary to Lai's teaching, that Utecht generally teaches using polymers having amine-containing units as retention and drainage aids and as fixatives for fillers such as titanium dioxide for making all known paper, paperboard and cardboard grades in amounts from 0.01% to 0.1% by weight of the dry fiber. Utecht teaches nothing of the kind.

The Examiner relies upon Carr and Varveri only for their teachings that retention aids are conventionally employed in papermaking processes "to increase the adsorption of fillers onto cellulosic fibers or to bind cellulosic fibers" (OA, p. 3, 1<sup>st</sup> full ¶; p. 5, ). Applicant agrees. The Examiner relies upon the teachings of Takahata, Snow, and Koichi to establish

that high opacity, high ash content papers are well-known in the art (OA, p. 5, 3<sup>rd</sup> ¶, to p. 6, l. 10). Again, Applicant agrees. The Examiner cites Lai exclusively for its teaching that acid hydrolyzed copolymers made from monomers including N-vinylformamide are cationic polymers (OA, p. 4, 2<sup>nd</sup> ¶, last sentence). Applicant asks the Examiner to fairly consider all of Lai's teaching.

Based exclusively on those limited portions of the prior art teachings that were considered by the Examiner, the Examiner found (OA, p. 3, 1<sup>st</sup> full ¶, last three lines; emphasis added):

. . . thus fixing the fillers to the fibers in the pulp is an inherent function in the use of the cationic polymer as a retention aid or, at least, fixing the fillers to the fibers would have been obvious to one of ordinary skill in the art.

The Examiner's finding of inherent fixing of the fillers to the fibers of the pulp is clearly erroneous when, as is currently claimed, "the cationic polymer . . . comprises at least 0.0005 %, but no more than 0.04 %, by conversion to solids concentration in terms of the dry mass of raw pulp, of a polymer obtained by 20 to 100 % hydrolysis of the total formyl groups in a polymer having at least N-vinylformamide units as a polymerization component" in accordance with Applicant's claims (Previously Presented Claim 4). Lai teaches (Lai, p. 8, ll. 32-50):

[T]he polymers were added to the fiber suspension at 0.5% consistency at addition levels of 0, 0.01, 0.05, 0.1, 0.2 and 1% based on fiber. . . . Hand sheets prepared in the manner described were conditioned at 50% RH and 73°F and test[ed] for filler retention using TAPPI standard method.

. . . . .

It can be seen that 7MM molecular weight poly(vinylamine) demonstrated a superior TiO<sub>2</sub> retention at 0.1-0.2% addition level to wood pulp.

At page 5, lines 54-56, Lai instructs:

The addition of 0.05 to 0.5 wt%, preferably 0.1 to 0.2 wt%, vinylamine polymer, based on fiber, to the aqueous cellulose fiber slurry (wet-end) provides for an increase in the dry strength of the paper product and an increase in the retention of titanium dioxide in those papermaking processes that use TiO<sub>2</sub>.

Thus, objective evidence of record shows, contrary to the Examiner's finding, that fixing the fillers to the fibers in the pulp is NOT an inherent function in the use of the cationic polymer as a retention aid, and shows, contrary to the Examiner's conclusion, that fixing the fillers to the fibers would NOT have been obvious to one of ordinary skill in the art with full knowledge of the pertinent art.

The fact that a certain result or characteristic may occur or may be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534 (Fed. Cir. 1993). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999)(citations omitted). An invitation to experiment is not an inherent disclosure. *Metabolite Labs., Inc. v. Lab. Corp. of Am. Holdings*, 370 F.3d 1354, 1367 (Fed. Cir. 2004).

*Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990), instructs:

In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.

In this case, the Examiner has not provided sufficient factual basis and/or technical reasoning to support a finding that the allegedly characteristics of Applicant's claimed process necessarily or inherently flow from Utecht's teachings.

Moreover, when Utecht's disclosure is considered in its entirety, its teaching is entirely consistent with Lai's teaching and supporting evidence. Utecht recognizes that papermaking processes conventionally employ fillers such as chalk (calcium carbonate) and titanium dioxide in the customary amounts (Utecht, col 6, ll 56-59; col 7, ll. 14-18).

However, Utecht teaches that its carbamate-functional polymers with amine-containing units are used as retention and drainage aids and as fixatives for paper stocks which contain “contraries” in amounts from 0.01% to 0.1% by weight of the dry fiber (Utecht, col. 6, l. 56, to col. 7, l.13). According to Utecht, its carbamate-functional polymers (Utecht, col. 6, ll. 59-65; emphasis added):

. . . are especially useful as processing aides in the dewatering of paper stocks which contain contraries. Contraries are, for example, ligninsulfonates or other ingredients of wood and humic acids. The carbamate-functionalized polymers to be used according to the invention can be used for making all known paper, paperboard and cardboard grades.

Utecht defines “contraries” as “ligninsulfonates or other ingredients of wood and humic acids” (Utecht, col. 6, ll. 59-62). Shortly thereafter, Utecht teaches (Utecht, col. 7, ll. 2-13; emphasis added):

The retention, drainage and flocculation aids are preferably used in papermaking in amounts from 0.01 to 0.1% by weight, based on the dry fiber materials. The carbamate-functionalized polymers additionally have a good fixing effect in such paper stocks as contain relatively large quantities of contraries; waste paper stocks, for example, contain contrary quantities of resins, polymeric binders and other contrary solids. To fix the contraries on the fibers or in the paper, the carbamate-functionalized polymers . . . are used for example in amounts from 0.001 to 0.1% by weight, based on dry paper stock.

Thus, Utecht employs polymers having amine-containing units as retention aids and fixatives in amounts from 0.001 to 0.1% by weight, based on dry paper stock, when the materials to be retained in the paper are “contraries” such as resins, polymeric binders, and other contrary solids.

On the other hand, Utecht mentions fillers such as chalk (calcium carbonate) and titanium dioxide when discussing the preparation of filler slurries. Utecht employs polymers having amine-containing units as emulsifiers in amounts from 0.1 to 2% by weight, preferably 0.5 to 1.5 %, based on the weight of the aqueous slurry. Utecht expressly states (Utecht, col. 7, ll. 14-20; emphasis added):

The carbamate-functionalized polymers are also useful as emulsifiers for preparing aqueous filler slurries which are used for example in the preparation of filled papers. Examples of suitable fillers are clay, chalk, titanium dioxide and kaolin. The quantities of emulsifier to prepare filler slurries range for example from 0.1 to 2, preferably from 0.5 to 1.5, % by weight, based on the aqueous slurry.

Persons having ordinary skill in the art would immediately recognize that 0.1 to 2 % by weight, based on the aqueous slurry, is a much higher percentage of emulsifier based on total solids concentration.

The disclosed fixing effects of Utecht's polymers, and their specified amounts of from 0.001 to 0.1 % by weight, based on dry paper stock, apparently are those related to fixing "contraries" in papermaking processes for making paper stocks containing large quantities of "contraries". They are not applicable to fixing fillers such as titanium dioxide and chalk in papers containing large quantities of such fillers. While the Examiner's finding that Utecht's polymers are useful as fixatives in amounts from 0.01% to 0.1% by weight of the dry fiber is correct, Utecht's polymers are used as fixatives for "contraries" in amounts from 0.01% to 0.1% by weight of the dry fiber, not fillers such as chalk and titanium dioxide. Utecht's polymers are used as fixatives for fillers such as chalk and titanium dioxide in much greater amounts than 0.1 to 2 %, preferably 0.5 to 1.5 % by weight, based on dry paper stock.

Thus, persons having ordinary skill in the art reasonably would have understood from Utecht's complete disclosure that:

- (1) Utecht's carbamate-functionalized polymers are useful for fixing "contraries" in pulp fibers in amounts from 0.001-0.1% by weight based on dry paper stock;
- (2) Utecht's "contraries" are not particulate fillers such as titanium dioxide and chalk;
- (3) Utecht does not teach that carbamate-functionalized polymers are useful for fixing particulate fillers to pulp fibers in amounts from 0.001-0.1% by weight based on dry paper stock;

- (4) Utecht teaches that carbamate-functionalized polymers are useful “in the customary amounts” as retention, drainage and flocculation aids and also as fixatives in papermaking;
- (5) Utecht teaches that carbamate-functionalized polymers are useful as emulsifiers for preparing aqueous filler slurries in amounts from 0.1 to 2, preferably 0.5 to 1.5% by weight, based on the aqueous slurry; and
- (6) Utecht teaches that carbamate-functionalized polymers are useful as retention aids for fillers such as chalk and titanium dioxide in amounts greater than from 0.1 to 2, preferably 0.5 to 1.5% by weight, based on the weight of the dry paper stock.

Lai’s teaching to use cationic polymers as retention aids for titanium dioxide in amounts ranging from 0.05 to 0.5 wt%, preferably 0.1 to 0.2 wt%, is entirely consistent with Utecht’s disclosure relating to the amounts of its polymers effective for use in aqueous filler slurries.

The method Applicant claims (Claims 4 and 9) requires:

- (1) fixing particulate fillers of titanium dioxide and/or calcium carbonate to pulp fibers using cationic polymer containing N-vinylformamide units in amounts from 0.0005-0.04%, preferably from 0.001-0.04%, by weight based on dry paper stock;
- (2) a mass ratio of cationic polymer to particulate filler ranging from 0.001/100 to 0.5/100 by conversion to solids concentration; and
- (3) an enhanced ash content and opacity of the filler-containing paper produced relative to the ash content and opacity of the filler-containing paper produced without including the cationic polymer in the pulp slurry.

While the Examiner finds that the properties, ratios, relative amounts, etc., required by Applicant’s claimed process are inherent in the process Utecht discloses, it should suffice



to say that the evidence of record shows that they are not inherent and a far greater weight of the evidence of record supports the patentability of Applicant's claimed process.

The combined teachings the Examiner relies upon to establish the obviousness of Applicant's currently claimed methods does not establish a sufficient factual basis for a conclusion of obviousness. The applied prior art, considered as a whole, reasonably would not have led persons having ordinary skill in the art to understand that increased amounts of titanium dioxide filler and/or chalk could be fixed to pulp fiber using substantially less of the cationic polymers identified in Applicant's claims than the prior art of record teaches and reasonably suggests with any expectation of successfully enhancing the opacity and ash content of the resultant paper. A conclusion of obviousness minimally requires some teaching, suggestion, or motivation to do what Applicant has done with reasonable expectation of success. *In re O'Farrell*, 853 F.2d 894, 903 (Fed. Cir. 1988). *See also KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 418-419 (2007)("[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.").

Teaching away, such as is readily apparent from the combined prior art teachings applied against Applicant's claimed process, is a strong indicator of nonobviousness. *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). In light of the prior art applied against Applicant's claimed process, the improved filler retention achieved by the process Applicant claims would have been unpredictable, unexpected, and truly remarkable.

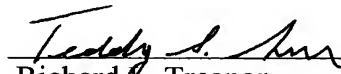
The Examiner's outstanding rejections all should be withdrawn.

Application No. 10/581,459  
Reply to Office Action of October 27, 2010

For the reasons stated herein, Applicant's current claims are patentable over the applied prior art and otherwise in condition for allowance. Accordingly, early Notice of Allowance is earnestly requested.

Respectfully submitted,

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